Answer on Question #49558, Physics, Mechanics | Kinematics | Dynamics

Question:

The mass of a planet is 4 times while its radius is 8 times that of earth. If the weight of an object is 640 N on earth, what will be its weight on the planet?

Answer:

Weight of an object equals:

$$W = mg$$

where m is mass of an object, g is gravitational field strength.

Gravitational field strength equals:

$$g = \frac{GM}{R^2}$$

where M is mass of the planet, R is radius of the planet.

$$\frac{W_1}{W_2} = \frac{g_1}{g_2} = \frac{M_1 R_2^2}{M_2 R_1^2} = \frac{4}{8^2} = \frac{1}{16}$$

where M_2, R_2 mass and radius of Earth, M_1, R_1 mass and radius of planet.

Weight of an object on the planet equals:

$$W_1 = \frac{W_2}{16} = \frac{640}{16} N = 40\ N$$

Answer: 40 N